

I claim:

1. A connection system for connecting two marine propulsion devices together,

5 comprising:

a first tie bar arm which is attachable to a first one of said two marine propulsion devices;

a first connecting link which is pivotally connectable to said first tie bar arm for rotation about a first axis;

10 a first rod assembly which is pivotally connectable to said first connecting link for rotation about a second axis;

a coupler which is attachable in a first direction of threaded association with said rod assembly; and

15 a second rod assembly which is attachable in a second direction of threaded association with said coupler, said first and second directions of threaded association being opposite to each other.

2. The connection system of claim 1, further comprising:

20 a second connecting link which is pivotally connectable to said second rod assembly for rotation about a third axis.

3. The connection system of claim 2, further comprising:

25 a second tie bar arm which is attachable to a second one of said two marine propulsion devices, said second tie bar arm being pivotally connectable to said second connecting link for rotation about a fourth axis.

4. The connection system of claim 1, wherein:

said first tie bar arm comprises a first attachment plate and a second attachment plate, said first and second attachment plates being generally parallel to each other, said first connecting link being disposable between said first and second attachment plates, said first axis extending through said first and second attachment plates and through said first connecting link.

5. The connection system of claim 1, wherein:

said first connecting link comprises a first clevis end, said first rod assembly being disposed within said first clevis end, said second axis extending through said first rod assembly and through said first clevis end.

6. The connection system of claim 1, further comprising:

said first tie bar arm comprises a first attachment plate and a second attachment plate, said first and second attachment plates being generally parallel to each other, said first axis extending through said first and second attachment plates and through said first connecting link;

said first connecting link comprises a first clevis end, said first rod assembly being disposed within said first clevis end, said second axis extending through said first rod assembly and through said first clevis end; and

said first connecting link comprises a second clevis end which is disposed between said first and second attachment plates, said first axis extending through said first and second attachment plates and through said second clevis end, said second clevis end being shaped to receive an extension portion of a third connecting link.

7. The connection system of claim 1, wherein:

said first and second axes extend in directions which are perpendicular to each other.

8. The connection system of claim 1, wherein:

5 said first direction of threaded association employs a right handed thread and
said second direction of threaded association employs a left handed thread.

9. The connection system of claim 1, wherein:

 said first direction of threaded association employs a left handed thread and
10 said second direction of threaded association employs a right handed thread.

10. The connection system of claim 1, wherein:

 said first and second rod assemblies are moved toward each other in
response to rotation of said coupler in a first rotational direction about its central
15 axis and said first and second rod assemblies are moved away from each other in
response to rotation of said coupler in a second rotational direction about its central
axis, said first and second rotational directions being opposite to each other.

11. The connection system of claim 4, further comprising:

20 a bolt extending through said first tie bar arm and through said first
connecting link coaxially with said first axis.

12. The connection system of claim 11, wherein:

 said bolt is a shoulder bolt which is sized to retain said first connecting link
25 in an uncompressed state between said first and second attachment plates.

13. The connection system of claim 11, further comprising:

at least one flanged radial bearing disposed around said bolt and between said first and second attachment plates.

14. The connection system of claim 13, further comprising:

5 a non-flanged radial bearing disposed around said bolt and between said first and second attachment plates.

15. The connection system of claim 1, wherein:

10 a first resultant force exerted by said first connecting link on said first tie bar arm is symmetrical with a second resultant force exerted by said first tie bar arm on said first connecting link, said first and second resultant forces being generally equal in magnitude and directed in opposite directions along a common axis:

16. The connection system of claim 15, wherein:

15 said first and second resultant forces combine to create approximately no net moment about any point.

17. A connection system for connecting two marine propulsion devices together, comprising:

20 a first tie bar arm which is attachable to a first one of said two marine propulsion devices;

a first connecting link which is pivotally connectable to said first tie bar arm for rotation about a first axis;

25 a first rod assembly which is pivotally connectable to said first connecting link for rotation about a second axis, said first and second axes extending in nonintersecting directions which are generally perpendicular to each other;

a coupler which is attachable in a first direction of threaded association with said rod assembly; and

a second rod assembly which is attachable in a second direction of threaded association with said coupler, said first and second directions of threaded association being opposite to each other, said first tie bar arm comprising a first attachment plate and a second attachment plate, said first and second attachment plates being generally parallel to each other, said first connecting link being disposable between said first and second attachment plates, said first axis extending through said first and second attachment plates and through said first connecting link.

18. The connection system of claim 17, further comprising:

a second connecting link which is pivotally connectable to said second rod assembly for rotation about a third axis.

19. The connection system of claim 18, further comprising:

a second tie bar arm which is attachable to a second one of said two marine propulsion devices, said second tie bar arm being pivotally connectable to said second connecting link for rotation about a fourth axis.

20. The connection system of claim 19, wherein:

said first connecting link comprises a first clevis end, said first rod assembly being disposed within said first clevis end, said second axis extending through said first rod assembly and through said first clevis end.

21. The connection system of claim 20, wherein:

said first connecting link comprises a second clevis end which is disposed between said first and second attachment plates, said first axis extending through said first and second attachment plates and through said second clevis end, said second clevis end being shaped to receive an extension portion of a third
5 connecting link.

22. The connection system of claim 20, wherein:

said first direction of threaded association employs a right handed thread and said second direction of threaded association employs a left handed thread.

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23. The connection system of claim 17, wherein:

said first and second rod assemblies are moved toward each other in response to rotation of said coupler in a first rotational direction about its central axis and said first and second rod assemblies are moved away from each other in
15 response to rotation of said coupler in a second rotational direction about its central axis, said first and second rotational directions being opposite to each other.

24. The connection system of claim 17, further comprising:

a bolt extending through said first tie bar arm and through said first
20 connecting link coaxially with said first axis.

25. The connection system of claim 24, wherein:

said bolt is a shoulder bolt which is sized to retain said first connecting link in an uncompressed state between said first and second attachment plates.

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26. The connection system of claim 25, further comprising:

at least one flanged radial bearing disposed around said bolt and between said first and second attachment plates.

27. The connection system of claim 17, wherein:

5 a first resultant force exerted by said first connecting link on said first tie bar arm is symmetrical with a second resultant force exerted by said first tie bar arm on said first connecting link, said first and second resultant forces being generally equal in magnitude and directed in opposite directions along a common axis.

10 28. The connection system of claim 27, wherein:

said first and second resultant forces combine to create approximately no net moment about any point.

29. A connection system for connecting two marine propulsion devices together,
15 comprising:

a first tie bar arm which is attachable to a first one of said two marine propulsion devices;

a first connecting link which is pivotally connectable to said first tie bar arm for rotation about a first axis;

20 a first rod assembly which is pivotally connectable to said first connecting link for rotation about a second axis, said first and second axes extending in nonintersecting directions which are generally perpendicular to each other;

a coupler which is attachable in a first direction of threaded association with said rod assembly; and

25 a second rod assembly which is attachable in a second direction of threaded association with said coupler, said first and second directions of threaded association being opposite to each other, whereby said first and second rod

assemblies are moved toward each other in response to rotation of said coupler in a first rotational direction about its central axis and said first and second rod assemblies are moved away from each other in response to rotation of said coupler in a second rotational direction about its central axis, said first and second rotational directions being opposite to each other, said first tie bar arm comprising a first attachment plate and a second attachment plate, said first and second attachment plates being generally parallel to each other, said first connecting link being disposable between said first and second attachment plates, said first axis extending through said first and second attachment plates and through said first connecting link.

30. The connection system of claim 29, further comprising:

a second connecting link which is pivotally connectable to said second rod assembly for rotation about a third axis.

31. The connection system of claim 30, further comprising:

a second tie bar arm which is attachable to a second one of said two marine propulsion devices, said second tie bar arm being pivotally connectable to said second connecting link for rotation about a fourth axis.

32. The connection system of claim 31, wherein:

said first connecting link comprises a first clevis end, said first rod assembly being disposed within said first clevis end, said second axis extending through said first rod assembly and through said first clevis end.

33. The connection system of claim 32, wherein:

said first connecting link comprises a second clevis end which is disposed between said first and second attachment plates, said first axis extending through said first and second attachment plates and through said second clevis end, said second clevis end being shaped to receive an extension portion of a third
5 connecting link.

34. The connection system of claim 29, further comprising:

a bolt extending through said first tie bar arm and through said first connecting link coaxially with said first axis.

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35. The connection system of claim 34, wherein:

said bolt is a shoulder bolt which is sized to retain said first connecting link in an uncompressed state between said first and second attachment plates.

15 36. The connection system of claim 35, further comprising:

at least one flanged radial bearing disposed around said bolt and between said first and second attachment plates.

37. The connection system of claim 29, wherein:

20 a first resultant force exerted by said first connecting link on said first tie bar arm is symmetrical with a second resultant force exerted by said first tie bar arm on said first connecting link, said first and second resultant forces being generally equal in magnitude and directed in opposite directions along a common axis.

25 38. The connection system of claim 37, wherein:

said first and second resultant forces combine to create approximately no net moment about any point.